

IN THE SPECIFICATION:

Page 1, before line 2, the paragraph beginning with "The present invention" insert the following title and paragraph:

-- PRIORITY CLAIM

This is a national stage of PCT application No. PCT/FI2004/000418, filed on July 1, 2004. Priority is claimed on Application No. 20031066, filed in Finland on July 11, 2003.

BACKGROUND OF THE INVENTION --.

Page 1, beginning on line 2, amend the paragraph as follows:

The present invention relates to a method, ~~according to the preamble of Claim 1,~~ for determining the location, relative to the grab transporting it, of the end heads of rolls used for packing rolls of paper, cellulose, and board.

Page 1, beginning on line 5, amend the paragraph as follows:

The invention also relates to an ~~arrangement~~ apparatus intended to apply the method.

Page 1, beginning on line 6, amend the paragraph as follows:

The wide roll of paper coming from a paper machine is first of all transported to a slitter-winder and cut into rolls of suitable width. Next, the rolls are packed for transport. When paper rolls are packed, inner end heads are first of all placed on their ends, after which the necessary amount of wrapping is wrapped around the roll, the ends of which are folded on top of the inner end heads at the ends of the roll. An outer end head is glued on top of the folded wrapping and the internal end head, usually by hot-sealing. The inner end head is normally quite thick and protects the end of the roll from mechanical damage. The outer end head is, in turn, thinner and its task is to secure the package on the end of the roll and protect the roll from moisture. Often the ~~colour~~ color and patterning of the outer end head are used to give the roll a neat [a] appearance. The length and diameter of the roll being packed are measured prior to packing and suitably sized end heads are selected for the ends of the roll of the basis of the measurement results.

Page 2, beginning on line 14, amend the paragraph as follows:

In another system, the end heads are placed in piles on the floor of the mill hall and are transferred to the end of the rolls using a portal-operation head setter. The transfer portal is ~~built~~ built above the piles of heads and the head setters are generally installed on the same transversely movable guides. Thus, there must be a separate pile of heads of a specific size for each grab. ~~US patent 5-157-265~~ U.S. Patent No. 5,157,265 discloses a method for determining the size and position of end heads, which is suitable for use in connection with the above system. In this measurement method, the end head lifted by the grab is taken at a known speed past two pairs of photoelectric cells, so that the arrival of the front edge of the head at the position of the cells and the passing of the rear edge of the head are detected on the basis of the change in the signals of the photoelectric cells. The distance between the points of intersection can be calculated from the known speed of the head and the difference in the time of change in the signals. Because the shape of the head is known, its position and size can be determined. Because the lifting position of the grab relative to the head pile is known, the real position of the head pile can be determined from the position of the head on the grab.

Page 3, beginning on line 6, amend the paragraph as follows:

The method disclosed in ~~US patent 5-157-265~~ U.S. Patent No. 5,157,265 has, however, several weaknesses, due to which it is not suitable for use in the transfer of end heads taking place with a robot. Because a two-side grab, in which the heads are on top of each other, must be used with the robot, the photoelectric cells are not able to distinguish from which edge of the head the signal changes, so that this method cannot be used when using a two-sided grab, unless depth-range detection is set for the photoelectric cells, so that they will detect only the desired head from heads lying on top of each other. Because only two photoelectric cells are used in the method, it cannot be used to detect edge damage. If a faulty part of the edge coincides with the path of the photoelectric cell, the size and position of the head will be calculated wrongly and the head may be taken to broke, even though in fact it might be completely usable. The rejection of a head is not in itself a problem, but after rejection a new head must be lifted, which of course will disturb the operation of the packing line. Usually, however, the head is taken to the press plate and the operator is given an error notification, when he will correct the position of the head

visually or place a new head on the press plate. This can only be done when the movements of the robot are sufficiently slow while correction of error situations greatly disturbs the operation of the packing line. The movements of the robot must be slowed for reading of the position of the end head to be made with sufficient precision. Similarly, in an error situation, the movement must be stopped, so that the operator can safely enter the area of movement of the robot. Thus, it is possible to operate in the manner ~~describe~~ described above also when using robot head setting, but the greatest benefit will not, however, be gained from the robot, due to the necessarily slow speed of movement of the robot.

Page 4, beginning on line 7, amend the paragraph as follows:

~~Patent US 5 376 805~~ U.S. Patent No. 5,376,805 discloses a method for determining the size and position of an end head relative to the grab transporting the head. The grab is moved by a robot with several degrees of freedom and the measurement of the head takes place in a separate measuring station. The measuring station has three photoelectric cells, passed which the head is taken. A detection element is fitted to the grab, with the aid of which the position of the tool-point of the grab is determined when the grab passes the first detection element. The position and size of the head is determined on the basis of the segments obtained with the aid of the signals given by the detectors from the edges of the head. In this solution too, a separate measuring station is used, so that the transfer of the head to the end of the roll is slow, or else a high-efficiency ~~re~~ robot must be used, by means of which a high acceleration and deceleration can be ~~achieves~~ achieved. If the size of the head is not determined, but is instead given as initial data to the system, only two photoelectric cells will be needed and two points for determining the position of the end head.

Page 4, before line 20, the paragraph beginning with "The present invention", insert the following title:

--SUMMARY OF THE INVENTION--.

Page 5, lines 1 to 4, delete the two paragraphs.

Page 5, beginning on line 6, amend the paragraph as follows:

The most important advantage of the invention is that the position of the end head can be determined during the transfer movement of the head, while the head is attached to the grab. Thus, extremely rapid measurement is achieved. The use of the methods referred to above do not achieve a sufficiently rapid stage time on modern high-capacity packing lines and the invention solves precisely this problem. The end head need not be taken to a separate measuring station, so that one work stage is eliminated from the transfer of the head. Thus the transfer movement of the head can be substantially accelerated and the capacity of the packing system can be in this way increased, or else cheaper and slower robots or manipulators can be used for the transfer of the end heads. Because a separate measuring station is not needed, the floor space demanded by the packing system is reduced and the path of motion of the grab can be designed more ~~freely~~ freely. This brings benefits particularly when rebuilding packing system and in existing mill premises. Naturally, the price of the system is also lower, as one separate device can be eliminated.

Page 5, before line 19, the paragraph beginning with "In the following," insert the following title:

-- BRIEF DESCRIPTION OF THE DRAWINGS --.

Page 6, before line 4, the paragraph beginning with "The lifting of the", insert the following title:

-- DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENTS --.

Page 11, line 1, change "Claims" to --What is claimed is--.

IN THE TITLE:

Amend the title as follows:

Method and ~~Arrangement~~ Apparatus for Measuring the Position of an End Head of a Roll